MASS.
TC20.1:
979-980

UMASS/AMHERST
312066 0285 2686 3

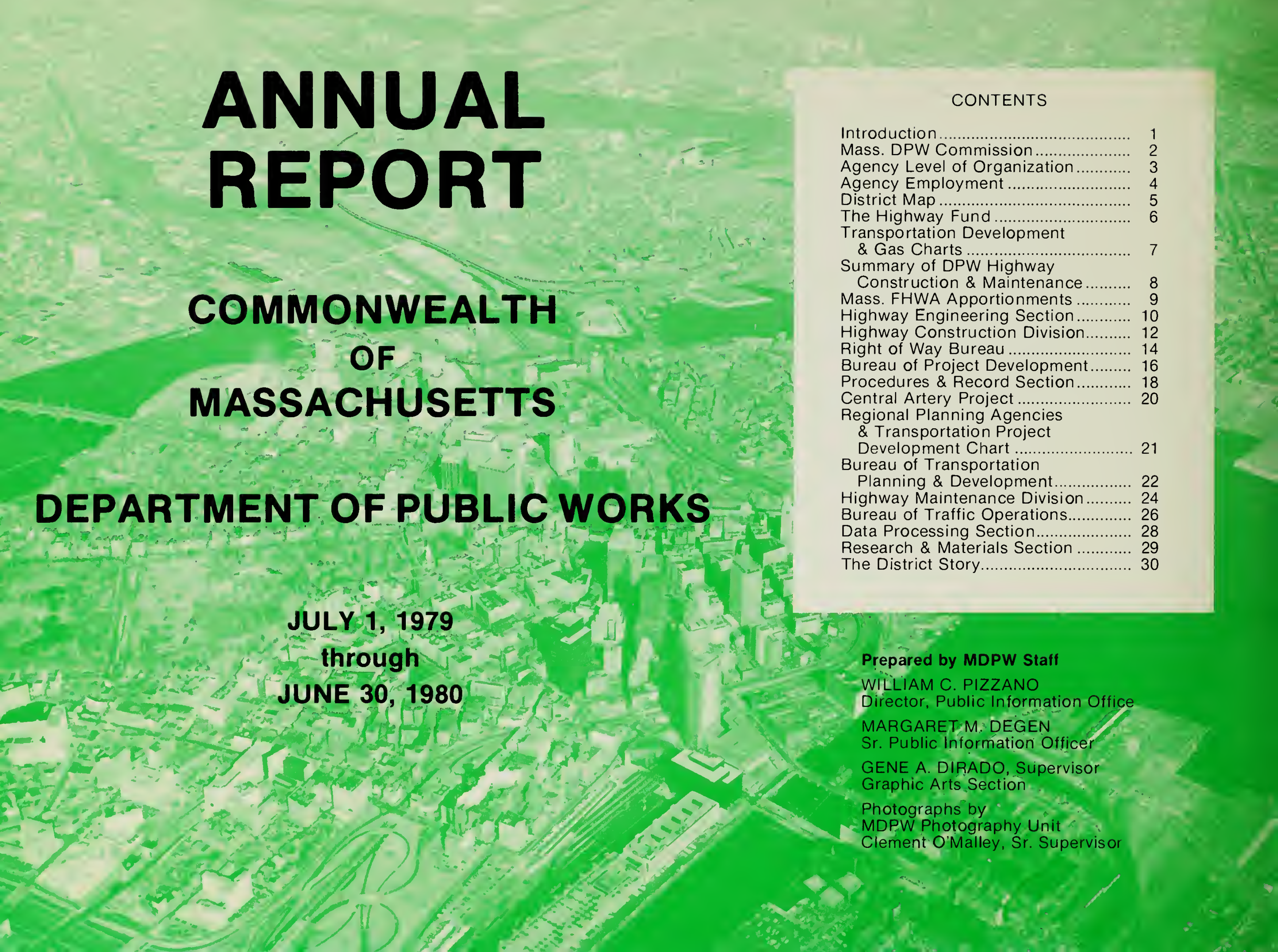
ANNUAL REPORT

July 1, 1979 · June 30, 1980

MASS/AMHERST LIBRAR

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT
OF
PUBLIC WORKS



Aerial view of downtown Boston.

ANNUAL REPORT

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC WORKS

JULY 1, 1979
through
JUNE 30, 1980

CONTENTS

Introduction 1
Mass. DPW Commission 2
Agency Level of Organization 3
Agency Employment 4
District Map 5
The Highway Fund 6
Transportation Development & Gas Charts 7
Summary of DPW Highway Construction & Maintenance 8
Mass. FHWA Apportionments 9
Highway Engineering Section 10
Highway Construction Division.......... 12
Right of Way Bureau 14
Bureau of Project Development......... 16
Procedures & Record Section 18
Central Artery Project 20
Regional Planning Agencies & Transportation Project Development Chart 21
Bureau of Transportation Planning & Development................. 22
Highway Maintenance Division.......... 24
Bureau of Traffic Operations............. 26
Data Processing Section.................... 28
Research & Materials Section 29
The District Story............................... 30

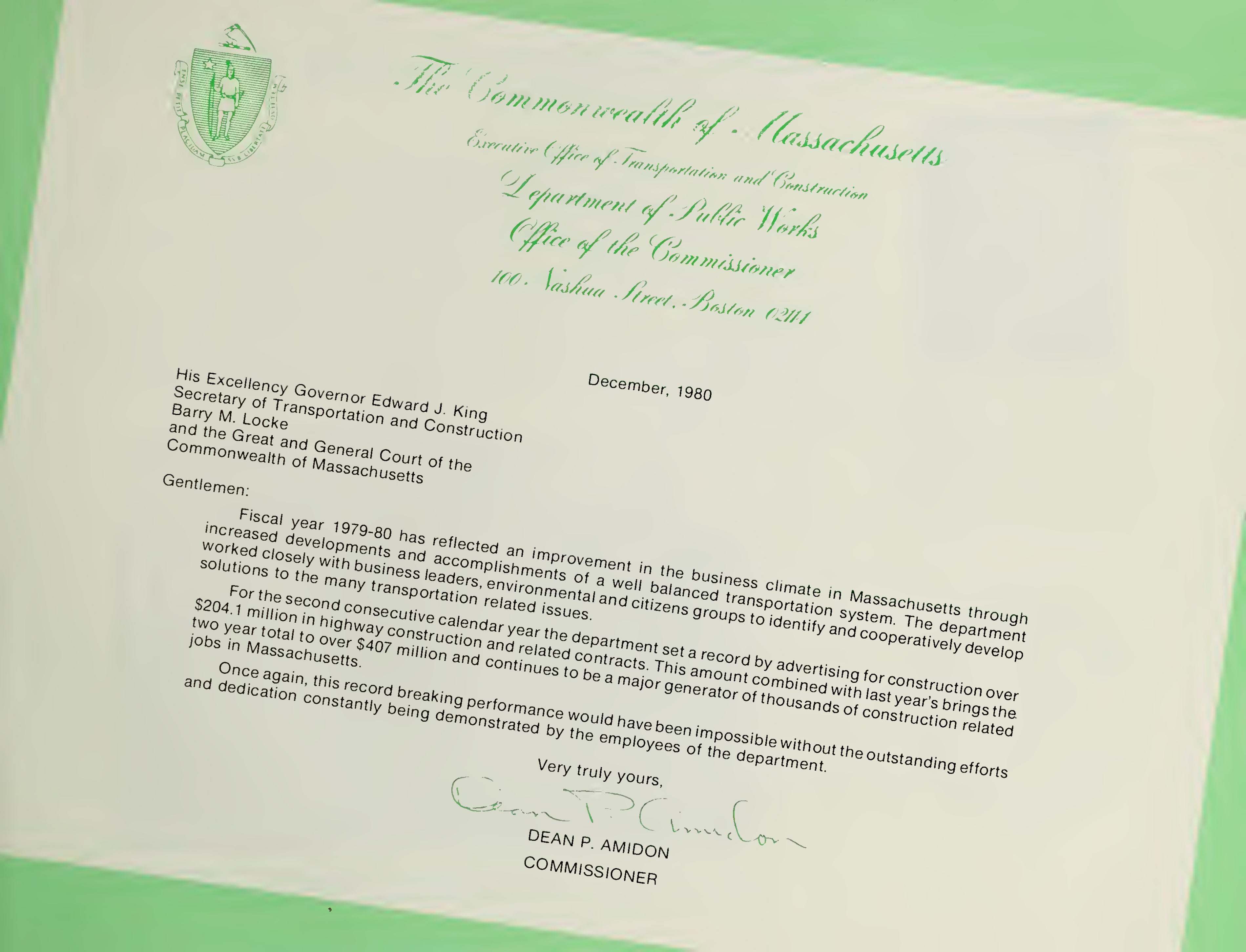
Prepared by MDPW Staff

WILLIAM C. PIZZANO
Director, Public Information Office

MARGARET M. DEGEN
Sr. Public Information Officer

GENE A. DIRADO, Supervisor
Graphic Arts Section

Photographs by
MDPW Photography Unit
Clement O'Malley, Sr. Supervisor



The Commonwealth of Massachusetts
Executive Office of Transportation and Construction
Department of Public Works
Office of the Commissioner
100 Nashua Street, Boston 02114

December, 1980

His Excellency Governor Edward J. King
Secretary of Transportation and Construction
Barry M. Locke
and the Great and General Court of the
Commonwealth of Massachusetts

Gentlemen:

Fiscal year 1979-80 has reflected an improvement in the business climate in Massachusetts through increased developments and accomplishments of a well balanced transportation system. The department worked closely with business leaders, environmental and citizens groups to identify and cooperatively develop solutions to the many transportation related issues.

For the second consecutive calendar year the department set a record by advertising for construction over $204.1 million in highway construction and related contracts. This amount combined with last year's brings the two year total to over $407 million and continues to be a major generator of thousands of construction related jobs in Massachusetts.

Once again, this record breaking performance would have been impossible without the outstanding efforts and dedication constantly being demonstrated by the employees of the department.

Very truly yours,

Dean P. Amidon

DEAN P. AMIDON
COMMISSIONER

MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS COMMISSION

DEAN P. AMIDON is a 31-year career employee for the department and a professional civil engineer

He served as district highway engineer in District 1 (Lenox) from 1969 to 1979 He was appointed commissioner of the Mass Department of Public Works by Governor Edward J King in January, 1979 Commissioner Amidon is a resident of Monterey

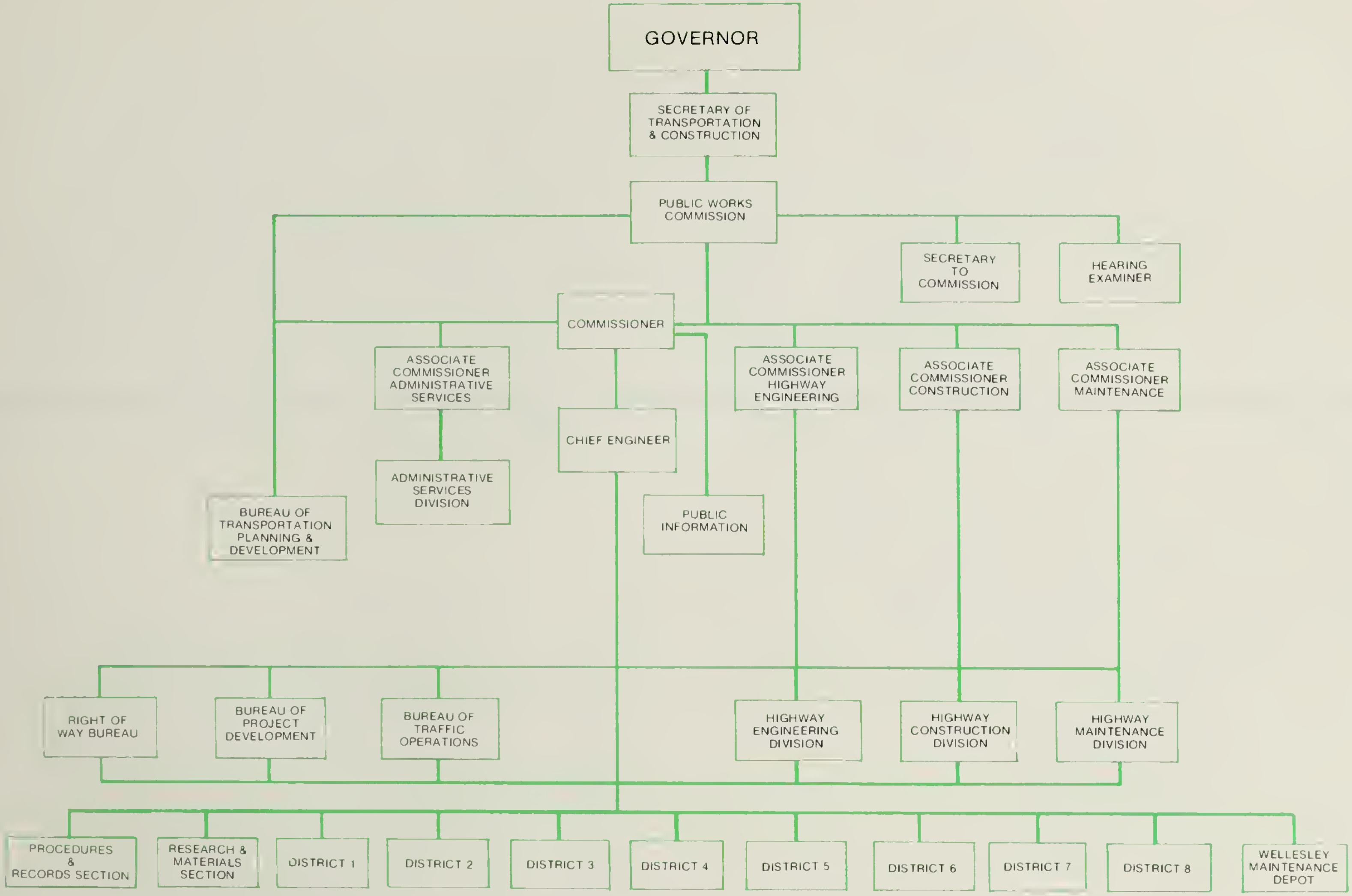
Because of a growing interest and need to develop a more comprehensive highway network, the Legislature established a commission in 1892 to improve the commonwealth's roadways called the Massachusetts Highway Commission.

On January 1, 1921 both the Massachusetts Highway Commission and the Commission on Waterways and Public Lands were abolished by the Legislature and a new Department of Public Works established. This new organization held the responsibilities of both former commissions under a commissioner and four associate commissioners.

After a series of department reorganizations, the present Department of Public Works is managed by a commissioner and four associate commissioners all of whom are appointed by the governor. Each associate commissioner is assigned by the commissioner to oversee a particular phase of department activites conducted under the areas of Administrative Services, Highway Engineering, Highway Construction and Highway Maintenance.

MDPW Commission (L to R) — Associate Commissioner of Highway Engineering, Frank D. Rodick; Associate Commissioner of Maintenance, Peter E. Donadio; Commissioner Amidon; Associate Commissioner of Administration, Thomas G. Barlow; and Associate Commissioner of Construction, Sandino J. Tersigni.

Massachusetts Department of Public Works


GOVERNOR
SECRETARY OF TRANSPORTATION & CONSTRUCTION
PUBLIC WORKS COMMISSION
SECRETARY TO COMMISSION
HEARING EXAMINER
COMMISSIONER
ASSOCIATE COMMISSIONER ADMINISTRATIVE SERVICES
ASSOCIATE COMMISSIONER HIGHWAY ENGINEERING
ASSOCIATE COMMISSIONER CONSTRUCTION
ASSOCIATE COMMISSIONER MAINTENANCE
CHIEF ENGINEER
ADMINISTRATIVE SERVICES DIVISION
BUREAU OF TRANSPORTATION PLANNING & DEVELOPMENT
PUBLIC INFORMATION
RIGHT OF WAY BUREAU
BUREAU OF PROJECT DEVELOPMENT
BUREAU OF TRAFFIC OPERATIONS
HIGHWAY ENGINEERING DIVISION
HIGHWAY CONSTRUCTION DIVISION
HIGHWAY MAINTENANCE DIVISION
PROCEDURES & RECORDS SECTION
RESEARCH & MATERIALS SECTION
DISTRICT 1
DISTRICT 2
DISTRICT 3
DISTRICT 4
DISTRICT 5
DISTRICT 6
DISTRICT 7
DISTRICT 8
WELLESLEY MAINTENANCE DEPOT

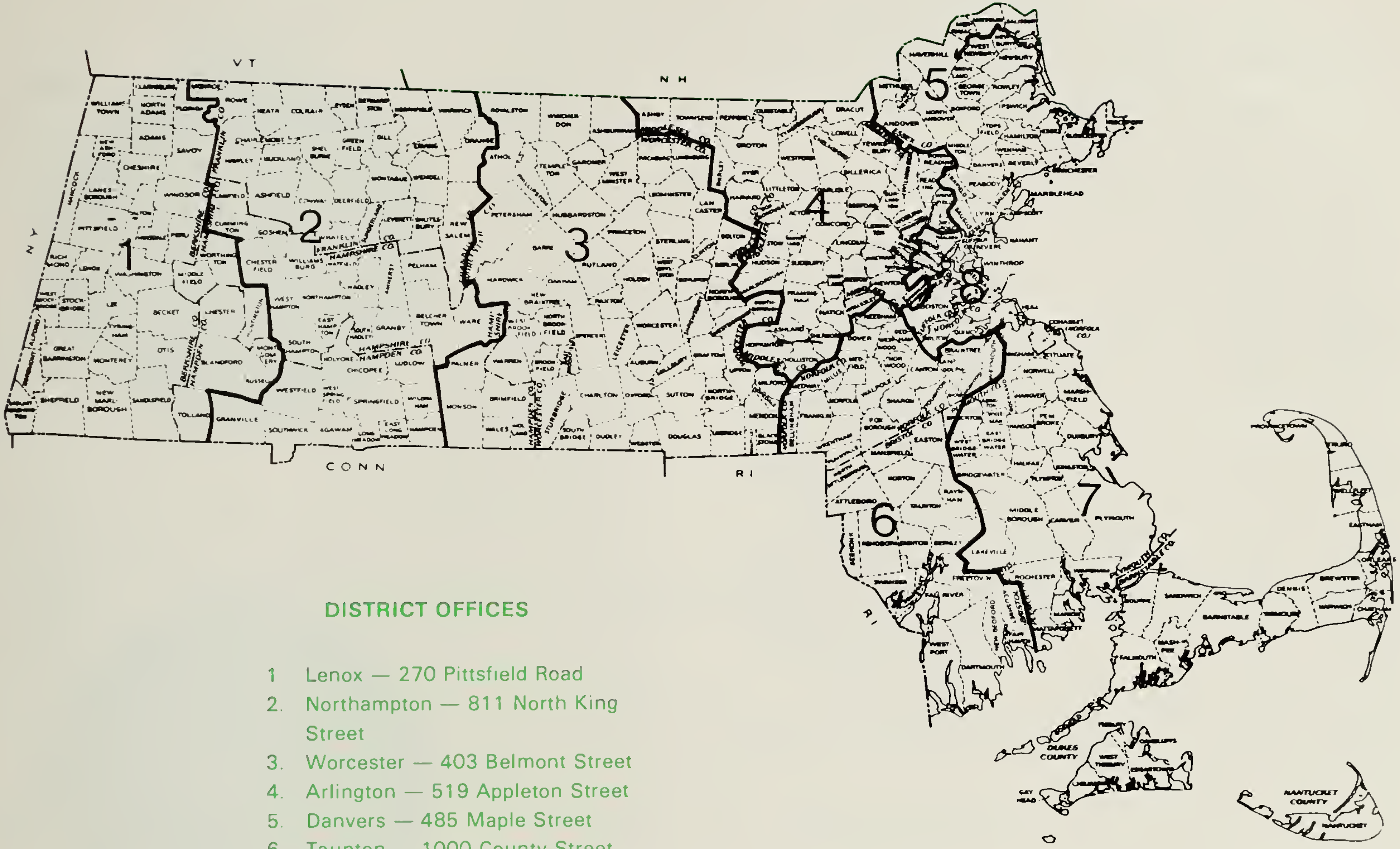
Number of Employees in Mass. DPW (1980)

FUNCTIONAL DISTRIBUTION	1975	1976	1977	1978	1979	1980
Policy & Planning	212	202	224	181	160	163
Construction & Engineering	1620	1435	1458	1352	1442	1408
Maintenance	2327	2179	2094	2132	2150	2030
Administrative Support & Overhead	400	347	362	436	414	382
TOTAL	4559	4163	4138	4101	4166	3983

GEOGRAPHICAL DISTRIBUTION

Boston Headquarters	1162	1040	1050	1042	1077	1033
District 1 (Lenox)	227	211	210	219	212	202
District 2 (Northampton)	354	327	327	323	336	319
District 3 (Worcester)	439	416	412	386	396	418
District 4 (Arlington)	453	408	410	409	405	373
District 5 (Danvers)	394	368	350	354	360	343
District 6 (Taunton)	633	588	575	581	559	513
District 7 (Middleborough)	440	391	384	368	387	379
District 8 (Boston)	255	230	239	232	241	221
Wellesley (Maintenance & Sign Shop)	135	124	122	127	133	117
Wellesley (Research & Materials)	67	60	59	60	60	65
TOTAL	4559	4163	4138	4101	4166	3983

Mass. D.P.W. District Boundaries



DISTRICT OFFICES

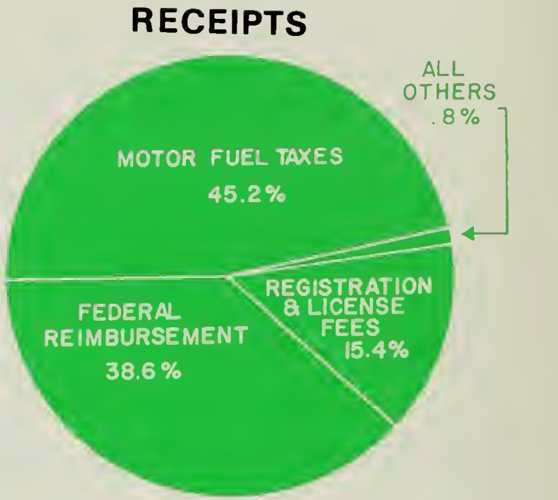
1. Lenox — 270 Pittsfield Road
2. Northampton — 811 North King Street
3. Worcester — 403 Belmont Street
4. Arlington — 519 Appleton Street
5. Danvers — 485 Maple Street
6. Taunton — 1000 County Street
7. Middleborough — 151 Pierce Street
8. South Boston — 400 "D" Street

THE HIGHWAY FUND

RECEIPTS

Major receipts from highway users as shown on the accompanying pie chart are for fiscal year 1979:

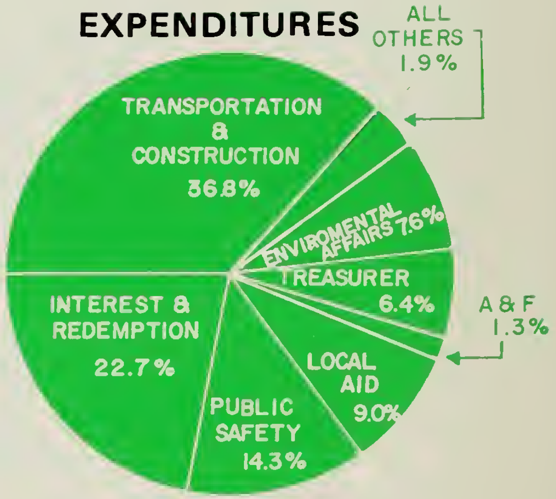
Motor Fuel Taxes (Hwy. Fund)	$193.8 million
Federal Reimbursements (Hwy. Fund)	12.2 million
Federal Reimbursements (Fed. Hwy. Const. Prog. Fund)	153.2 million
Registration & License Fees	65.8 million
Miscellaneous	3.6 million



EXPENDITURES

Total Highway Fund expenditures for fiscal year 1979 amounted to $305 million. Major expenditures from the highway fund are shown on the accompanying pie chart.

Executive Office of Transp. & Const.	112.5 million
Interest and Redemption of Debt	69.2 million
Public Safety	43.7 million
Local aid for roadways	27.4 million
Environmental Affairs	23.1 million
Treasurer	19.4 million
A & F	4.0 million
Others	5.9 million



GAS TAX RECEIPTS

FISCAL YEAR	1979		1980	
	RECEIPTS	CUMULATIVE TOTALS	RECEIPTS	CUMULATIVE TOTALS
JULY	10,256,967		16,239,802	
AUG.	26,267,655	36,524,622	14,417,386	30,657,188
SEPT.	6,221,594	42,746,216	13,812,379	44,469,567
OCT.	31,018,544	73,764,760	22,395,887	66,865,454
NOV.	17,008,037	90,772,797	19,985,386	86,850,840
DEC.	13,706,760	104,479,577	18,175,459	105,026,299
JAN.	20,270,325	124,749,882	13,548,341	118,574,640
FEB.	13,919,200	138,669,082	20,079,372	138,654,012
MARCH	15,922,505	154,591,587	17,754,937	156,408,949
APRIL	30,943,313	185,534,900	14,263,731	170,672,680
MAY	18,741,000	204,275,901	19,100,634	189,773,314
JUNE	19,472,861		22,261,593	
TOTAL		223,748,762		212,034,907

1980 TRANSPORTATION DEVELOPMENT IMPROVEMENT PROGRAM (IN MILLIONS)

HIGHWAY PORTION	FEDERAL FUNDS (APPROPRIATION)	STATE FUNDS (BONDS)	TOTAL
FEDERAL-AID INTERSTATE CONSTRUCTION	$180.0	$ 20.0	$200.0
FEDERAL-AID CONSTRUCTION OTHER THAN INTERSTATE	116.0	39.0	155.0
ENGINEERING SERVICES	16.0	9.0	25.0
PLANNING AND RESEARCH		4.0	4.0
ADMINISTRATIVE AND ENGINEERING EXPENSES		12.0	12.0
BRIDGES — NON FEDERAL-AID		5.0	5.0
IMPROVEMENTS TO MAINTENANCE SITES		2.0	2.0
HIGHWAY AID TO CITIES & TOWNS		20.0	20.0
HIGHWAY — NON FEDERAL-AID		40.0	40.0
IMPROVEMENTS TO NORTHEAST EXPRESSWAY		12.0	12.0
CHELSEA — REVERE MILL CREEK		1.5	1.5
RESERVE FOR CONTINGENCIES		5.0	5.0
TOTAL HIGHWAY PORTION	$312.0	$169.5	$481.5

Summary of DPW Highway Construction & Maintenance

Calendar Year	Accelerated Highway Program Acts	$ Value of Const. Projects Adv.	# Lane Miles State Hwys. Maintained
1960	$ 86,000,000	$ 75,000,000	7049
1961	90,000,000	73,000,000	7243
1962	110,000,000	79,000,000	7522
1963	125,000,000	86,000,000	8133
1964		73,000,000	8300
1965	320,000,000	62,000,000	8614
1966		90,000,000	8443
1967	200,000,000	101,000,000	8754
1968		63,000,000	8936
1969	260,000,000	173,000,000	9266
1970		63,000,000	9395
1971		79,000,000	9530
1972	561,000,000	143,000,000	9780
1973		92,000,000	10550
1974		136,000,000	11438
1975	353,000,000	187,000,000	11566
1976		182,000,000	11600
1977	589,900,000	143,000,000	11600
1978		155,882,000	11600
1979	481,500,000	203,700,000	11600
1980		180,000,000 Est.	11600

PROJECTS ADVERTISED

JULY	1979	$ 28,591,205
AUGUST	1979	20,855,009
SEPTEMBER	1979	32,258,387
OCTOBER	1979	13,829,727
NOVEMBER	1979	1,809,068
DECEMBER	1979	8,143,212
JANUARY	1980	26,183,590
FEBRUARY	1980	6,304,593
MARCH	1980	14,596,978
APRIL	1980	8,287,008
MAY	1980	13,878,844
JUNE	1980	15,202,329
	TOTAL	$ 189,939,950

5 YEAR SUMMARY

(Average/Year)

Construction Projects Adv.	($)	# Lane Miles Maintained
1961-1965	75 million	8,000
1966-1970	100 million	9,000
1971-1975	130 million	10,000
1976-1980	170 million	11,600

Massachusetts Federal Highway Administration Apportionments*

CATEGORY	Fiscal Yr. 1977	Fiscal Yr. 1978	Fiscal Yr. 1979	Fiscal Yr. 1980	Fiscal Yr. 1981
Interstate	1,440,925	38,170,446	69,735,961	105,119,005	84,713,763
Interstate Gap Closing	— — —	16,623,649	30,250,680	— — —	— — —
Interstate Resurfacing	— — —	2,098,652	2,033,683	2,102,160	2,072,753
Consolidated Primary	20,276,525	20,805,314	22,048,002	22,269,811	27,931,797
Secondary Rural	3,221,459	3,465,127	3,925,383	5,311,976	5,789,781
Urban System	23,944,099	23,944,099	24,005,337	24,005,337	24,005,337
Highway Planning Research (1½%)	744,409	1,597,371	2,304,599	2,521,154	2,200,720
MTA Planning (½%)	945,715	1,545,579	1,034,394	1,108,574	1,149,785
High Hazard-Rd. Side Obstacles	2,723,279	2,721,033	— — —	— — —	— — —
Hazard Elimination	— — —	— — —	2,722,120	3,266,356	— — —
Rail-Hwy. Crossings (on sys.)	2,458,456	2,497,303	2,442,930	2,449,926	— — —
Rail-Hwy. Crossings (off sys.)	1,475,074	1,498,382	— — —	— — —	— — —
Safer Off Sys. Rds.	3,323,025	3,258,226	3,274,588	— — —	— — —
TOTAL	60,552,966	178,778,147	521,333,971	689,488,270	837,352,206

ALLOCATIONS					
Pavement Markings	764,537	787,722	1,018,729	946,261	— — —
Spcl. Br. Repl.	5,946,768	1,704,641	— — —	— — —	— — —
Highway Br. Repl. & Rehabilitation	— — —	— — —	13,456,219	18,812,994	— — —
Econ. Growth Ctr. Dev'l.	436,393	— — —	— — —	— — —	— — —

*Federal Fiscal Year, from 10/1 — 9/30

Highway Engineering Section

Highway Design • Consultant Contract Engineer • Plans Section • Roadside Development • Urban Systems • Urban Design Specifications • Plans & Records • Layouts • Hydraulics • Utilities • Bridge Section • State Aid •

The department continues its noteworthy transition from the emphasis almost entirely on highway construction to a truly multimodal transportation agency. This continues to be best reflected by the awarding of contracts for railroad rehabilitation, bikepaths, MBTA related projects, carpool lanes and park and ride facilities. This reflects the versatility of the Highway Design Section, which is responsible for the engineering and administration required to produce construction plans necessary for advertising these projects.

With a jurisdiction over approximately 170 current bridge and highway design contracts, the Highway and Structures Section strives to coordinate MDPW personnel on a statewide basis into an integrated task force. Dedicated to the production of high quality design prior to the construction stage of such above mentioned projects, the Highway and Structures Section maintains a biannual progress review of all current design contracts under its jurisdiction.

During FY 80 the department advertised the gaps of three major interstate routes. Interstate 391 from Springfield to Holyoke, I-495 Foxborough to Bridgewater and I-190 from Worcester to Leominster are now all under construction.

Major expressways on new locations still form a part of the engineering effort, particularly geared toward completion of an interstate system. Design emphasis is increasingly placed on reconstruction and upgrading of existing roadway pavement and bridge rebuilding, removal or protection of hazardous objects, the installation of the latest in safety equipment and appurtenances.

Built into our design are a variety of measures to minimize adverse environmental impacts. Among these are flatter grades to decrease the need for winter salting, drainage systems which carry road water runoff beyond water supplies, ponds and other sites where even the slightest chloride contamination would be harmful, sedimentation basins to prevent silting of streams, noise barriers to decrease the impact of traffic on schools and residences.

Again this year, a major product of highway engineering are safety projects. These include: bridge replacements, safety screening, impact attenuation devices, the removal and/or protection against fixed hazardous objects.

The Urban Systems Section is subordinate to the highway design engineer. It administers and reviews most statewide projects which are federally funded on the basis of their location on a federally designated urban highway. Within the designated urban systems areas of Massachusetts are approximately 200 communities which are eligible for urban systems funding to the extent of 75% participation by the Federal Highway Administration (FHWA) in the construction of projects under such funding.

Projects included under this category involve safety improvements (e.g. road widening, traffic signal updating, highway lighting, traffic channelization, etc.), total roadway reconstructions and on occasion, bridge replacements. Within this past year this section has processed 60 projects at an approximate cost of $20 million dollars.

The Roadside Development Section is a reaffirmation of the department's commitment to maintain the aesthetics and physical integrity of those landscapes which bestride the various statewide highway construction projects. Landscaping an area under construction to preserve scenic enhancement, beautification of major highways and the design of roadside rest areas and essential fa-

I-190 and Route 2 interchange in Leominster, Mass.

cilities for the traveler are some of the functions of this section.

An attractive and exemplary product of this section is the small prototype sanitary facility under construction in Westwood (see illustration).

Of major achievement is the present construction of a safety rest area for a future major information center on Route 3 in Plymouth. The information center portion of the above project is presently under design.

The Bridge Rehabilitation and Replacement Section develops priorities for the department's 2700 owned bridges with spans in excess of 20 feet. In addition to these MDPW owned bridges, this section coordinates an off-system program for over 1600 bridges, over 20 feet, owned by cities and towns.

The U.S. Surface Transportation Assistance Act of 1978 made off-system bridges eligible for federal funding for the first time during FY 80. To date, at least 15% to 35% of a state's federal bridge funds must be spent for off-system bridges. The act provides Massachusetts with $20 million for bridge replacement and rehabilitation in FY 81.

Bridge design emphasis is increasingly placed on reconstruction and upgrading of existing facilities. To accomplish this, a major effort is underway to rate all bridges, so that their need and order of priority for rehabilitation or replacement can be assessed.

Prototype of year-round restroom facility being installed at I-95/Route 128 rest area, Westwood.

State aid for communities is another major responsibility. A $20,000,000 distribution authorized by Chapter 480, Acts of 1979, provided the 351 municipalities in the commonwealth with funds for constructing town and county ways for FY 80 and 81. This amount was in addition to funds assigned for apportionment by the department from ½¢ of the gas tax receipts.

Distributions totalling $41,540,000 were disbursed to the communities under Chapter 497 Acts of 1971. This Act provides for returning 1¢ of gas tax receipts to the municipalities for highway purposes. Also distributed was $20,969,803 for highway and transit development to the 322 municipalities outside the core area of the Massachusetts Bay Transportation Authority (MBTA). From this amount a distribution of $18,469,803 was made to 272 non-MBTA municipalities for highway reconstruction and maintenance. The remainder is allocated among the 50 fringe MBTA communities.

During FY 80 the department completed 4 bikeway projects at a cost of $110,404 with $264,787 for 6 more underway. The longest project awarded was for clearing a 16 mile section of former railroad right-of-way from Dennis to Eastham. This project ("The Cape Cod Rail Trail") is being constructed with the Department of Environmental Management and is scheduled for completion in 1981.

Highway Construction Division

Construction Section • Contract Engineering • Final Review Section

Projects Awarded for Fiscal Year Ending June 30, 1980

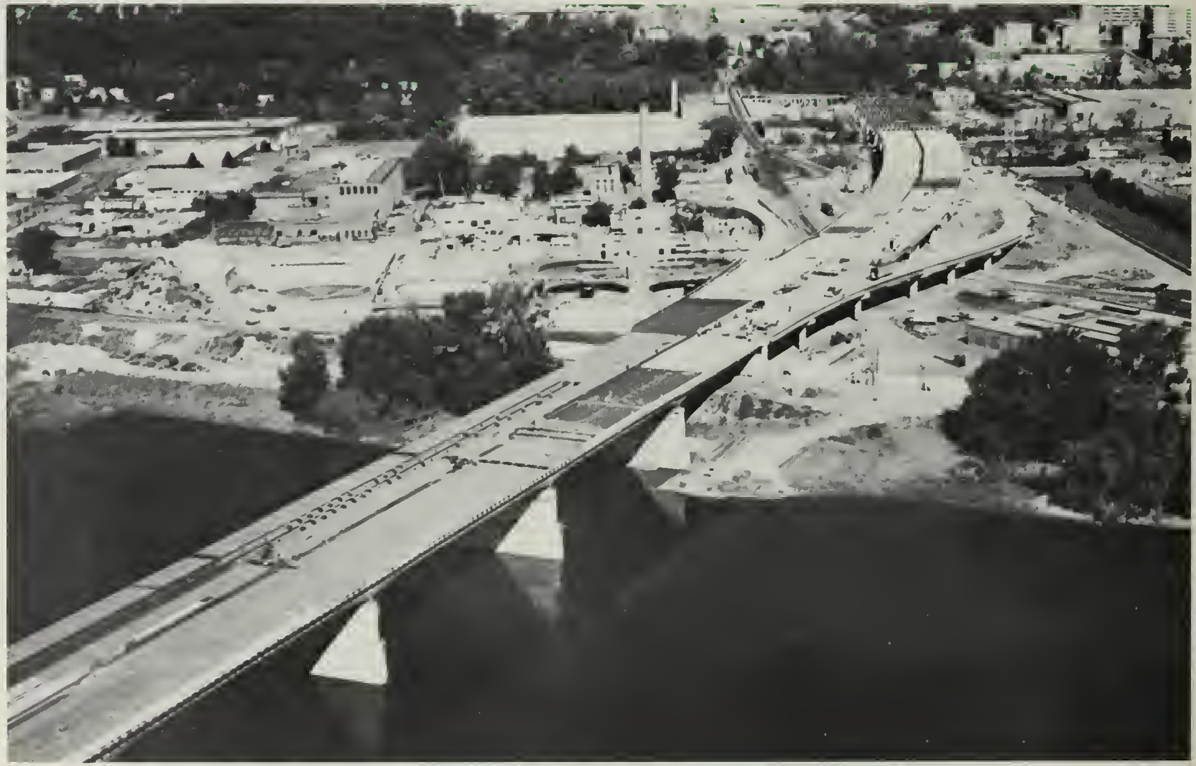
NUMBER	CATEGORY		AMOUNT
72	Federal Aid	$	166,012,512.01
19	State Highway — Construction		808,648.20
12	Chapter 90 — State Aid		2,435,266.25
336	Maintenance		28,717,664.92
439	TOTAL	$	197,974,091.38

During the Fiscal Year July 1, 1979 to June 30, 1980 a total of 369 contractors were prequalified.

During the 1980 fiscal year, the Construction Division assumed the responsibility for engineering supervision and staff advice of approximately $170,000,000 of new construction projects. The actual number of projects active during the year was 225 including those previously awarded.

Included in the above total, both new and on-going, are major projects such as I-391 in Chicopee and Holyoke which represent approximately $96,000,000 of construction; I-190 from Worcester to Leominster at a cost of approximately $127,000,000; and I-495 from Mansfield to Bridgewater at a cost of approximately $65,000,000. In addition there were smaller projects upgrading and reconstructing existing highways and bridges, safety improvements, grade crossing improvements and guard rail and signing upgrading.

The Construction Section continued its policy of conducting seminars in the districts during the winter season for construction personnel. This was accomplished with the cooperation and participation of the Federal Highway Administration and various sections of the department including the Bridge Section, the Bureau of Traffic Operations, the Highway Design Section, the Bureau of Project Development and the Bureau of Transportation, Planning and Development. The Asphalt Institute also assisted with the seminars by furnishing slides and movies.



New I-391 Connecticut River Bridge under construction between Chicopee and Holyoke.

Intersection of I-495 at its terminus with Routes 24 and 25 in Raynham/Bridgewater.

Mansfield section of I-495 extension at relocated Route 140.

The department continues to encourage contractors to utilize minority subcontractors and to employ minorities and women by stipulating a percentage of the total contract value which must be sublet to minority contractors. The department also requires a certain number of minorities and/or women to be employed in the various trades on all projects.

The Contract Engineering Section processes the bids for federal aid projects requiring Federal Highway Administration concurrence, state highway construction projects, Chapter 90 projects, maintenance projects, boring projects, projects for the construction, reconstruction, alteration, remodeling, repair, or demolition of buildings under the provision of General Laws, Chapter 149. This section also processes right of way projects involving the sale of houses and the leasing of state owned property from bid opening to award of contract and maintains all the necessary records thereof.

The prequalification and postqualification of contractors is administered by this section and the issuance of proposal forms and plans to prospective bidders requires the approval of this section. Force account agreements with public utilities, cities and towns are also reviewed for approval.

Right of Way

The Right of Way Bureau is responsible for the acquisition of land or rights in land needed for the construction, maintenance and improvement of the state highway systems in Massachusetts. Furthermore, the Right of Way Bureau has the added responsibility of monitoring all acquisition activity by cities and towns in connection with Urban Systems Projects. In order to meet its obligations, the Right of Way Bureau must undertake a wide and diversified range of legal and administrative activities which has developed professional expertise in a range of fields. These include real property law, eminent domain law, appraising, conveyancing, negotiating, property management, relocation of household and businesses, highway beautification, building codes, zoning and the processing of documents required by state and federal regulations.

During fiscal year 1980, the Right of Way Bureau acquired 965 parcels of land from 515 property owners. The acquisition awards paid for these properties totaled $14,074,260. During this period, the major activities of this bureau involved the acquisition of the properties required for the completion of Interstate Route 391 in Holyoke, the Route 25 extension in Plymouth-Wareham-Bourne, the Capen Circle and Ivory Street projects in Braintree, the Austin Street widening in Worcester, the Route 140 widening in Gardner-Westminster and the Boston Park Plaza Transportation Building site and Urban Systems Projects. All properties required for the construction of these projects have been acquired and construction has either started or is expected to begin shortly.

Completed functional replacement of the Church of the Nativity, Chicopee with new I-391 bridge across Connecticut River shown in background.

Listed below are a few highlights of the activities of the Right of Way Bureau, indicating the nature of the bureau's work. The Property Management Section, for example, is responsible for the management of all structures acquired including maintenance, the resale of structures for removal, the collection of rents, the preparation of leases and the sale and lease of excess lands.

This section received the following income during fiscal year 1980: Rentals, $477,742.56; Leases, $229,682.52; and Sales of structures and excess land, $257,230.42. Total income was $964,655.50, while expenses for managing properties were $23,303.61, leaving a net income to the commonwealth of $941,351.89. One of the leases executed in fiscal year 1980 was an "Air Rights" lease which allows for the current construction of the Trailways Bus Terminal building over the Central Artery Expressway in the vicinity of Dewey Square, Boston. The Trailways Bus Company had been displaced as a result of the acquisitions required for the Park Plaza Transportation Building site.

The Project Section, which interviews property owners and obtains all data and plans required for appraisal of cases, worked in over 95 cities and towns securing information for 681 cases.

The Conveyancing Section was responsible for the completion of 515 full title examinations and 559 rundown title examinations. In addition, 18 deeds for the transfer of 317 parcels of excess land were prepared and 2 easements and 10 leases were also prepared.

The staff appraisers assigned to the Appraisal Section prepared 496 appraisals and fee appraisers working under contract for the bureau completed another 219 appraisals. All of the appraisal reports were reviewed by the Appraisal Review Section.

In order to clear the acquired rights of way for construction, it was necessary to relocate 63 families from their homes and 18 businesses. This was accomplished with the least amount of inconvenience to the persons and businesses involved by the Relocation Section of this bureau. The cost of relocation benefits which were paid to claimants totaled $2,404,093. The Relocation Planning Section was involved in approximately 40 projects and developed 16 conceptual stage or right of way stage relocation plans.

One property which has been taken for highway purposes, the Church of the Nativity in Chicopee, was functionally replaced during this period. The construction cost of the new church was $1,800,000. Planning is currently underway for the functional replacement of the Worcester Registry of Motor Vehicles building, a municipal swimming pool in Holyoke and a storage building for the University of Massachusetts located in Wareham.

Also, a functional restoration of a B & M Railroad public delivery facility is currently under construction in Chicopee on commonwealth owned excess land which is to be deeded to the railroad. The estimated cost of the new facility is $360,000. The existing Chicopee public delivery facility was acquired for the I-391 highway project.

Finally, the Sign Control Section was involved in the removal of 1,507 illegal noncompensable signs that were located within the state highway layout. During fiscal year 1980 this section initiated the removal of 10 legal nonconforming signs for which compensation was made.

Boston's Park Square, location of the new transportation building, shown cleared for construction. Governor King (far right) and Massachusetts DPW Commissioner Amidon (third from left) join Massachusetts DPW associate commissioners in a groundbreaking ceremony for the new building.

Bureau of Project Development

Location Survey (*Location Section, Geodetic Section Photogrammetric Section)*

Environmental Section • Special Products

The Bureau of Project Development is responsible for transportation projects and related activities after the Bureau of Transportation, Planning and Development (BTPD) has assigned priorities to them under their system planning phase. The bureau's work continues the "3C" planning process, a continuing, cooperative and comprehensive effort, using full citizen participation to develop projects from preliminary engineering through basic design, complying with applicable federal and state environmental laws.

The bureau is responsible for the study of transportation alternatives within a corridor location. It develops the various alternatives within the corridor using the "no-build" option as a basis for comparison.

The bureau prepares preliminary plans and profiles with cost estimates, and develops the socio-economic and environmental impacts for each alternative. The study produces a recommended alternative and a draft environmental impact statement. After a public hearing, if the project does not have major opposition, a basic design report is completed with a final environmental impact statement. The project, if approved by federal and state officials, then can proceed into the final design phase.

In cooperation with the BTPD, corridor planning studies are jointly developed. The development of these studies requires constant involvement with regional planning agencies, state and local officials, civic groups and the general public to increase the acceptability of proposed projects. In addition, multi-modal transportation projects are developed and interfaced between highways and public transit and parkway facilities.

In order to prepare necessary preliminary project plans, 15 location studies were worked on as FY 80 in-house projects. Additionally, seven consultant project development engineering and environmental contracts were under supervision of the Location Section. Assistance was rendered in the development of three consultant contracts under the supervision of the Environmental Section, by monitoring and suggesting modification to the engineering and geometrics involved.

Throughout the year extensive use was made of the state helicopter to photograph proposed facility corridors so that a catalogue of oblique photos were obtained. The procedure minimizes repeated field trips and increases comprehension of geographic detail and land use for the development of studies.

The Survey Section provided 92 private survey parties to supplement 30 state survey parties during FY 80. These survey parties performed all the work necessary to complete preliminary surveys for plans and to lay out all work for construction projects.

During fiscal 1980, state and private parties ran approximately 61 miles of first and second order traverses and 107 miles of levels for second order vertical control. A most comprehensive control traverse project for the city of Newton was completed and adjusted along with beginning a control traverse for Coastal Zone Management between Manomet Point to the Cape Cod Canal.

During the past fiscal year the Photogrammetric Section awarded approximately five photogrammetric contracts, based on low bidder, totaling $139,625 for topographic maps covering 9.25 square miles. A statewide aerial photgraphy contract was awarded for $15,000 to be used on an as needed basis.

Also, the Photogrammetric Section renewed the annual 50-50 Cooperative Topographic Mapping agreement with the U.S. Geological Survey for $250,000 for updating and revising the 7½ minute topographic quadrangle maps to a scale of 1:25,000.

The Environmental Section prepares and reviews environmental statements regarding both the natural and man-made environment, in response to federal and state environmental legislation, specifically the National Environmental Policy Act, Section 4 (f) of the Federal Transportation Act and the Massachusetts Environmental Policy Act. These reports result in Federal Environmental Assessments and Findings of No Significant Impact (FONSI), Draft and Final Environmental Impact Statement (EIS), 4 (f) Statements, plus State Environmental Notification Forms (ENF) and Environmental Impact Reports (EIR).

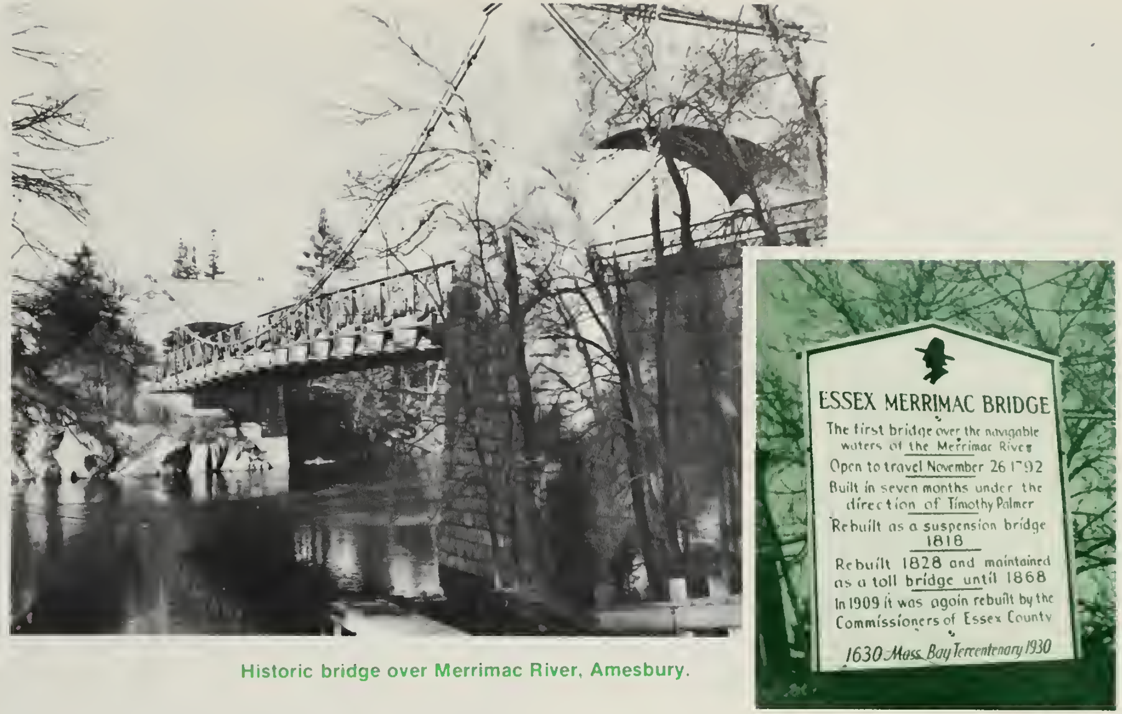
In fiscal year 1980, 131 ENFs were compiled or reviewed, resulting in ten EIRs which are now in process. Six Draft EIRs and two Final EIRs, initiated prior to fiscal year 1980, have been approved. The number of Environmental Assessments developed was three and the number reviewed was two. The Draft EIS for Route 7 — Lenox/Pittsfield/Lanesborough is now being prepared in the

Environmental Section, and there are three other projects for which EISs are being prepared. They are Route 2 West, Task B — Salem/Peabody and Route 44— Carver/Plympton/Kingston/Plymouth. Four EISs were approved during fiscal year 1980. Three 4 (f) statements were approved and six are in process.

A new function within the Environmental Section referred to as scoping, responds to recent federal regulations which require early coordination with other agencies and the public. Scoping is a continuous and ongoing process employing meetings with representatives of the appropriate disciplines to address issues as they emerge. Some areas of critical concern that are identified through scoping are wetlands, cultural resources, prime agricultural lands, endangered wildlife, vegetation, water, noise and air quality and open space. Impacts on these elements are reduced or eliminated through coordination with agencies having the necessary specific expertise.

Cultural resources (both historic and prehistoric) which might be affected by transportation projects are identified and reviewed for impact by a staff inter-disciplinary team composed of an engineer, a preservationist and an archaeologist, who incorporate the services of consultant archaeologists.

Approximately 50 major and minor projects have been reviewed for archaeological significance in fiscal year 1980. An archaeological survey conducted for one such project yielded the presence of a prehistoric rock shelter site in Marlborough. The Flagg Swamp rock shelter, surveyed by Harvard University under contract to the Massachusetts Department of Public Works, represents one of the most significant archaeological finds in New England and provides evidence for the presence of prehistoric man in the upland regions of New England some 5,000 years ago.


ESSEX MERRIMAC BRIDGE
The first bridge over the navigable waters of the Merrimac River
Open to travel November 26 1792
Built in seven months under the direction of Timothy Palmer
Rebuilt as a suspension bridge 1818
Rebuilt 1828 and maintained as a toll bridge until 1868
In 1909 it was again rebuilt by the Commissioners of Essex County
1630 Mass. Bay Tercentenary 1930

Historic bridge over Merrimac River, Amesbury.

One of the environmental concerns which the public has become conscious of in recent years is traffic generated noise. In response to this public concern, the air and noise specialist of the Environmental Section has been trained to evaluate impacts of traffic induced noise. Additionally, the department is initiating a program for providing relief to people adversely impacted by highway noise. Over three miles of noise barrier, composed of wood, concrete, earth and steel, have been constructed within Massachusetts.

The Special Projects Section during 1980 apportioned its workload into three objectives in the development of projects scheduled for advancement to the design stage or termination. Objective I includes projects requiring an engineering report adequate for a public hearing and consensus acceptance by FHWA, the affected region and the commonwealth.

Objective II is projects managed by the staff of the Environmental Section but requiring administrative supervision in contract scope. These include major bridge projects, environmental and archaeological projects. Objective III deals with the termination of complex projects which require resolution of long standing negotiations and major policy issues.

The Bureau of Project Development by virtue of its role of bridging the planning and design engineering activities is in continuous interaction between the scheduling needs of both bureaus.

Procedure and Records Section

The Procedures & Records Section, whose administrative offices are in Wellesley, is comprised of two field units; the Project Review Unit and the Equal Employment Opportunity (EEO) Unit. Teams from each unit monitor all statewide department highway and bridge construction projects for compliance in their respective area of responsibility, thereby helping to assure continued federal funding.

A. Administration

The P&R Section is responsible for administering several continuing areas of responsibility together with being available for special assignments from the chief engineer.

(1) Massachusetts Affirmative Action Program — After the implementation of this program, staff must review and approve projected manning tables and weekly man power reports on all projects valued in excess of $50,000. Quarterly work force projections indicating compliance with minority man-hours requirement in each job classification must be submitted by every contractor and subcontractor for P&R approval prior to working on the project. Compliance is monitored by the staff utilizing weekly reports submitted for the duration of the project.

(2) Minority/Women Contractor Percentage Participation — Staff completed this new provision for inclusion in department contracts establishing percentage participation as mandated by the Federal Register.

(3) Private Survey Party EEO Provision — After implementing EEO provision in this area, P&R staff monitors compliance and compiles a monthly report from form submissions required from the consultants.

(4) Training Special Provision — This contract provision on certain federal aid projects is aimed at training and/or upgrading minorities and women in construction. Over the past year staff has reviewed, approved and forwarded to the Federal Highway Administration (FHWA) for concurrence, 76 on-the-job training programs submitted by contractors whose contracts included this provision. Nineteen women were included among the 75 hired in various training categories over the past fiscal year.

(5) Supportive Services Contractor/Consultants — Presently three on-going statewide supportive services contractor/consultant contracts are being administered. Two of these provide supportive services to on-the-job trainees employeed in the respective consultant's geographical area. The third consultant is responsible for supportive services to established and/or potential minority contractors and subcontractors and to promote increased participation of Minority Business enterprises (MBE) in federal aid highway construction programs. These contracts are 100% federally reimbursed.

(6) Title VI Civil Rights — The section's civil rights officer participated in joint FHWA-MDPW Title VI Compliance Reviews of all divisions, bureaus and sections of the department.

B. Project Review Unit

Engineering teams conducted approximately 117 in-depth reviews of active highway and bridge construction projects throughout the commonwealth. These reviews consist of an inspection and audit of all project records relating to documentation for pay quantities, control of materials and equipment incorporated into the project. These reviews will assure compliance with specifications and department and federal requirements. This is followed by a field inspection of work in progress and completed to assure that accepted practices and quality controls are being maintained by the contractor and state personnel.

The Occupational Safety and Health Administration's (OSHA) requirements are also evaluated, together with safety measures taken to provide protection to the traveling public. The review format also includes EEO project compliance.

C. EEO Unit

External EEO Affirmative Action Program contract compliance on construction projects is monitored by the EEO Unit through a review process similar to the project review procedure. This procedure, like that of the construction reviews, is implemented throughout the duration of each project, commencing with participation at the pre-construction conference. Over the past year the procedure specifically included:

a) 101 Pre-construction Conferences
b) 8 Pre-bid Conferences
c) 4 Post Pre-construction Conferences
d) 59 On-site EEO Project Compliance Reviews
e) 22 Joint FHWA Project Compliance Reviews
f) 10 Home Office Joint Compliance Reviews

D. Standard Operating Procedures

This section continues to review all proposed new or revised Standard Operating Procedures (SOP) concerning engineering or technical operations of the department.

E. Liaison with Outside Agencies

(1) FHWA — In addition to formal contact with the FHWA division and regional offices, personnel of this section have continued to participate in seminars and workshops con-

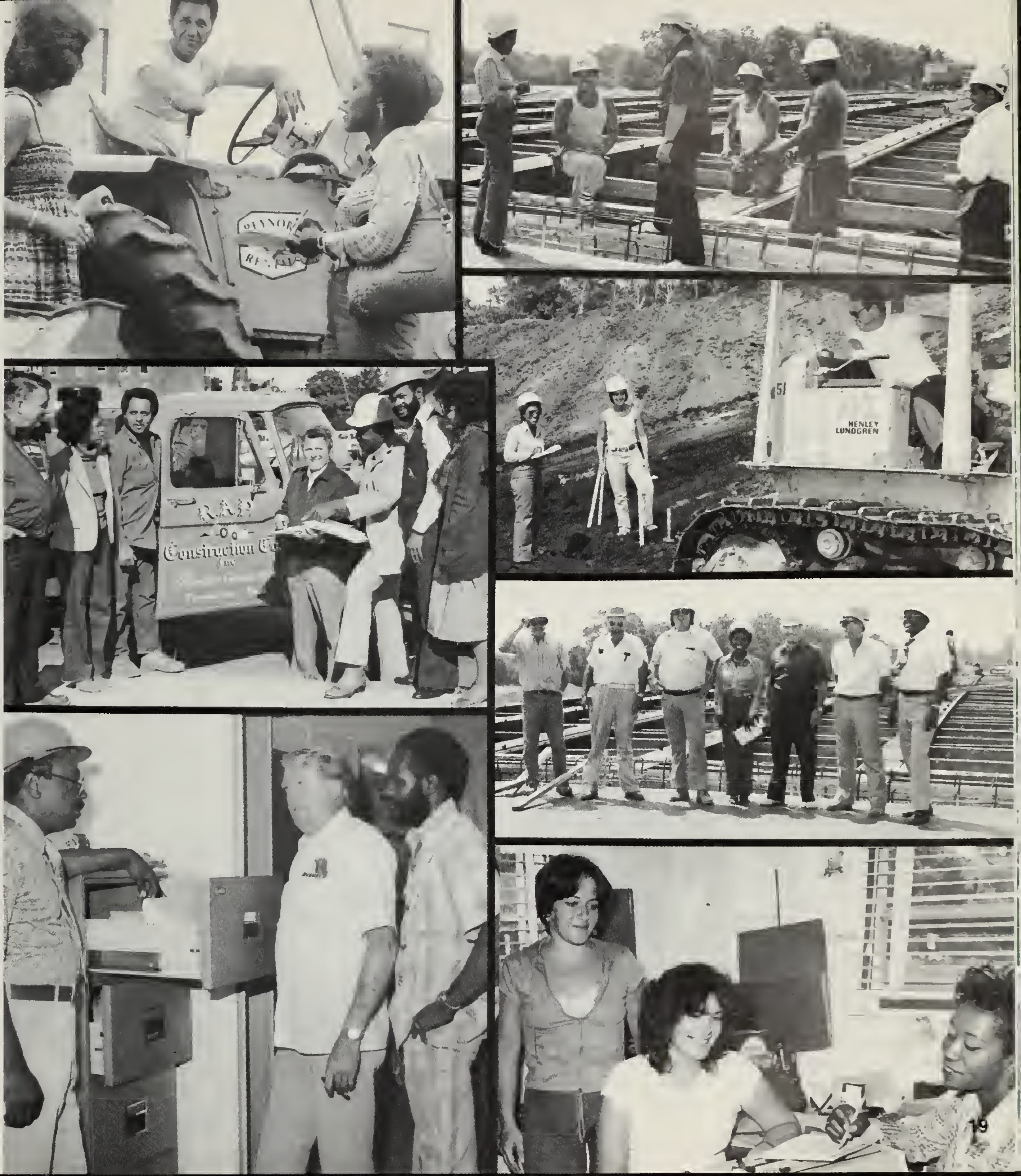
ducted at regional and national levels.

(2) American Association of State Highway Transportation Officials (AASHTO) and National Association of State Highway Transportation Officials (NASHTO) — The procedures & records engineer has been an active delegate to organizations of state highway officials.

(3) Other States, Organizations, etc. — Acting as liaison for the chief engineer and commissioner, this section has prepared replies to general and specific inquiries from other states. This section has maintained liaison via meetings and correspondence, particularly in the area of EEO, with the following: Mass. Commission Against Discrimination, Department of Labor & Industry, Department of Commerce & Development, Mass. Turnpike Authority, Metropolitan District Commission, Construction Industries of Massachusetts (CIM), Associate General Contractors (AGC), highway industry trade unions and minority organizations.

F. Special Assignments

At the request of the commissioner and chief engineer, engineering personnel conducted an in-depth review of the Final Estimate Section, specifically, to evaluate the section's overall effectiveness and efficiency and to review the procedures utilized in determination of final quantity payments for construction projects.



P & R Section field team personnel in various phases of project compliance reviews.

Central Artery Project

The Central Artery Section is responsible for the planning, environmental studies and design of major improvements to the Central Artery and the Third Harbor Tunnel in Boston. The Central Artery Project has been separated into three geographical areas: the North, located between the Prison Point Bridge and the Charles River; the Central, from the Charles River to the Dewey Square Tunnel; and the South, from the Dewey Square Tunnel to the Massachusetts Avenue Interchange.

The Central Transportation Planning Staff (CTPS) has been under contract to the department to provide support for the project. Together with CTPS, the Central Artery staff has undertaken an intensive participatory process to advise the public of agency actions and to include public concerns in the planning and design process.

A preliminary design contract for the North Area was awarded during FY 80. Allowing two years for its preliminary design and two years for final design, the North Area could be under construction by 1984. The completion of this construction in 1987 will result in improved traffic flow at the junction of I-93 and Route 1. Also, additional improvements to the Charlestown City Square neighborhood will evolve.

The design and development of specific analytical tools for use in assigning traffic volumes to the various alternatives being evaluated has been completed. In order to forecast future traffic volumes, 1990 and 2000 year trip tables were developed based upon CTPS socio-economic data and the latest Logan Airport enplanement forecast. In addition, the highway network was modified to reflect the 1990 and 2000 year changes based upon MDPW schedule of completed or committed projects.

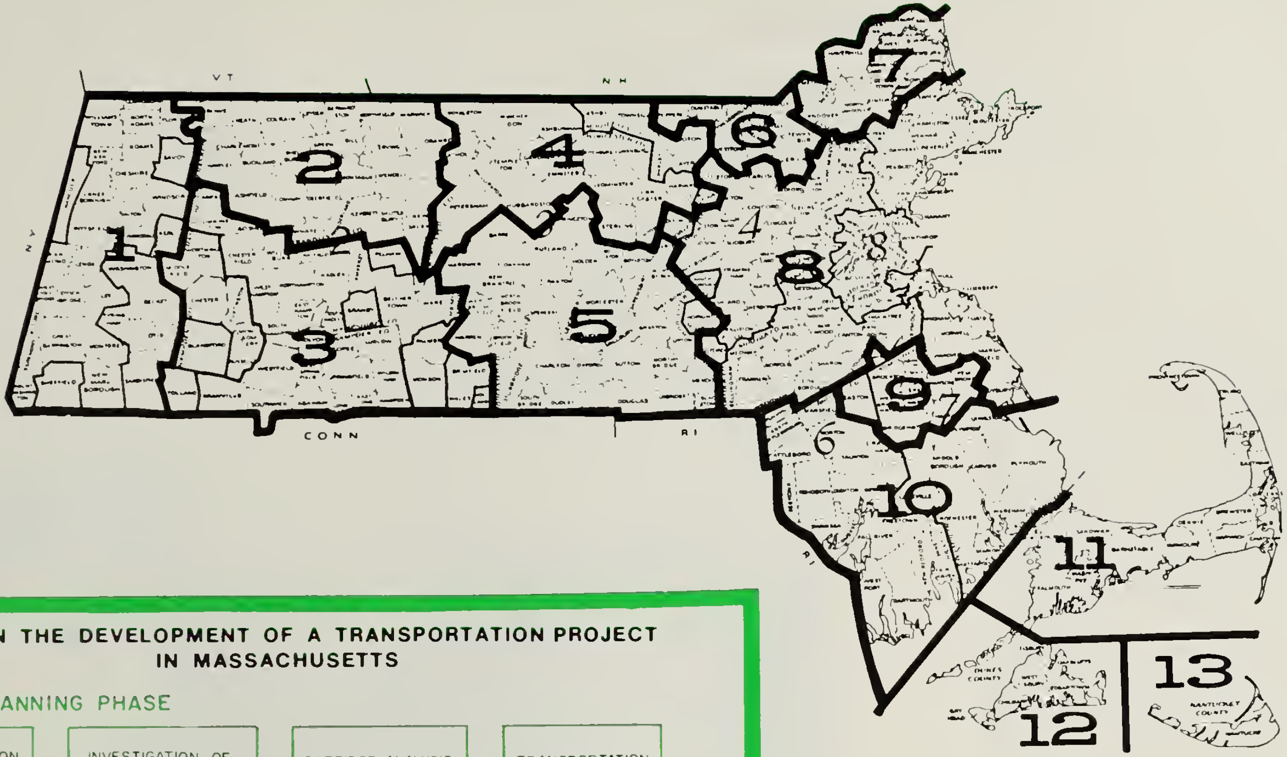
A draft Corridor Planning Study (CPS) for the Central and South sections of the artery plus the Third Harbor Tunnel has been published and distributed for review. The CPS was prepared by the CTPS with guidance and technical assistance from the Massachusetts Turnpike Authority and the Central Artery Section. The technical document addresses 13 alternatives which represent the most feasible combinations and will be used to obtain necessary input for advancement to the environmental impact study stage.

The individual concepts were analyzed for level of service, cross harbor compatibility including a special purpose harbor tunnel, public transit relationships, construction costs, environmental conditions, socio-economic, financial and legal impacts. In addition, the CPS includes schemes involving a direct connection from Storrow Drive to the Tobin Bridge.

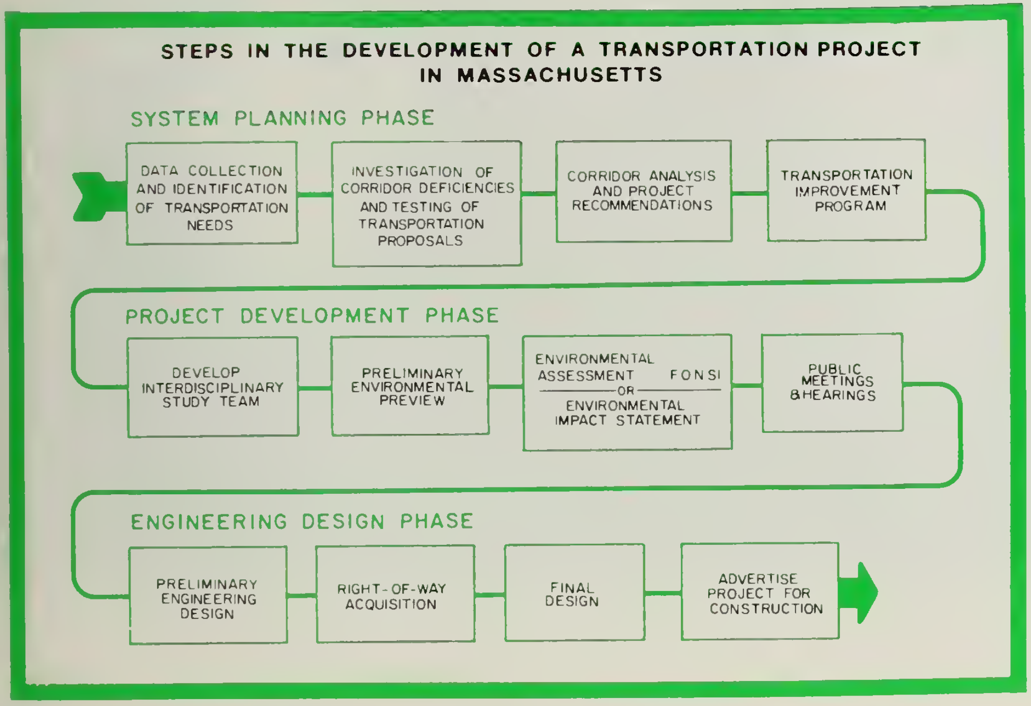
In mid-1981 the department expects final approval of the CPS and authorization to proceed with environmental studies.

Aerial view of Central Artery Project, North Area, City Square, Charlestown.

REGIONAL PLANNING AGENCIES



1 BERKSHIRE REGIONAL PLANNING COMMISSION
2 FRANKLIN COUNTY DEPARTMENT OF PLANNING
3 LOWER PIONEER VALLEY REGIONAL PLANNING COMMISSION
4 MONTACHUSETT REGIONAL PLANNING COMMISSION
5 CENTRAL MASSACHUSETTS REGIONAL PLANNING COMMISSION
6 NORTHERN MIDDLESEX AREA COMMISSION
7 MERRIMACK VALLEY PLANNING COMMISSION
8 METROPOLITAN AREA PLANNING COUNCIL
9 OLD COLONY PLANNING COUNCIL
10 SOUTHEASTERN REGIONAL PLANNING AND ECONOMIC DEVELOPMENT DISTRICT
11 CAPE COD PLANNING AND ECONOMIC DEVELOPMENT COMMISSION
12 DUKES COUNTY PLANNING AND ECONOMIC DEVELOPMENT COMMISSION
13 NANTUCKET COUNTY REGIONAL PLANNING COMMISSION



STEPS IN THE DEVELOPMENT OF A TRANSPORTATION PROJECT IN MASSACHUSETTS

SYSTEM PLANNING PHASE
DATA COLLECTION AND IDENTIFICATION OF TRANSPORTATION NEEDS
INVESTIGATION OF CORRIDOR DEFICIENCIES AND TESTING OF TRANSPORTATION PROPOSALS
CORRIDOR ANALYSIS AND PROJECT RECOMMENDATIONS
TRANSPORTATION IMPROVEMENT PROGRAM
PROJECT DEVELOPMENT PHASE
DEVELOP INTERDISCIPLINARY STUDY TEAM
PRELIMINARY ENVIRONMENTAL PREVIEW
ENVIRONMENTAL ASSESSMENT FONSI
OR
ENVIRONMENTAL IMPACT STATEMENT
PUBLIC MEETINGS & HEARINGS
ENGINEERING DESIGN PHASE
PRELIMINARY ENGINEERING DESIGN
RIGHT-OF-WAY ACQUISITION
FINAL DESIGN
ADVERTISE PROJECT FOR CONSTRUCTION

Bureau of Transportation Planning and Development

Highway Data Collection and Planning Services •Data Analysis and Computer Services •Regional Transportation Planning • Program Development •Capital Expenditure and Project Programming

The Bureau of Transportation Planning and Development's main objective is to serve as the principal source of transportation planning for the commonwealth, in accordance with its legislative mandate (Section 3A of Chapter 16 of the General Laws).

The bureau was formed in 1964 as part of the state's response to the 1962 Federal Aid Highway Act requirement that called for the establishment of a comprehensive, cooperative and continuing transportation planning process ("3C" process) in urbanized areas. The continuing implementation of the "3C" process is focused upon the 13 regional planning agencies' jurisdictions that encompass all 351 communities in the commonwealth.

The bureau is responsible for the conduct and the preparation of comprehensive and coordinated transportation plans and programs. It develops a wide variety of transportation information and statistics for use by other agencies, municipalities and the private sector.

During the year, the bureau broadened the department's ridesharing program, Masspool, to reach communities and employers statewide. Ridesharing has become a major tool in offsetting rising energy costs and in reducing peak hour travel on highways and urban streets.

Caravan, a non-profit, third party organization established to conduct a vanpool program, has also been highly successful, placing 34 vanpools in operation serving 500 commuters in its first year of existence. Combined with the vanpooling effort, the bureau has helped to establish a 40 space vanpool parking lot in the North Station area of Boston in cooperation with the Metropolitan District Commission.

In addition, the bureau coordinates and implements community based and regional bikeway proposals. Eight new bikepaths have been moved into the project development phase while another six were under construction and six were contracted.

The bureau completed the I-93 Joint Transportation Study of the 26 mile I-93 corridor from Woburn to the New Hampshire border, taking lead responsibility in this nine month effort. The study produced numerous program and project recommendations, including, improvements to transit, a series of park and ride facilities, upgraded interchanges and systems management pro-

Bureau of Transportation, Planning and Development Director, Edward H. Collagan, Jr. (left) with Massachusetts DPW Commissioner Amidon at opening of Boston's vanpool free parking area made available by the Metropolitan District Commission.

jects.

A major data collecting responsibility of the bureau is traffic volume counting. At present there are three types of traffic counting stations being used: permanent or continuous-count stations (26 in number), control stations (112) and coverage stations (850). The results of the counting program are shown in the annual bureau publication, "Massachusetts Traffic Volumes".

A prime function of the bureau is the translation of the collected volume counts into refined travel-demand estimates. These estimates, along with information from origin and destination surveys, serve as a basic input to department studies.

Highway travel statistics compiled from the bureau files are used to estimate air quality impacts and to evaluate energy conservation strategies such as the 55 mph speed limit. Also, vehicle miles of travel statistics are a basis for the determination of the amount of federal aid highway safety funds received by the state.

The bureau maintains the functional classification of every road and street in the state. This functional classification, established and updated in cooperation with local officials, serves as the basis for the determination of how each road and street fits into the federal aid system of the highways and its eligibility for funding.

Road inventory data is continually updated by the bureau in cooperation with district highway offices and local communites. Among the most comprehensive of state maintained road inventories in the country, the bureau data contains detailed information on over 33,000 miles of road open to public travel in the state. One of its many important applications is the funding determination of federal and state aid to local communities.

Last year, the Highway Performance Monitoring System (HPMS) Study was completed and submitted to the Federal Highway Administration (FHWA). This study provides for continuous monitoring of the state's highway system in each of the states for future reports to Congress. This effort was recognized through a letter of commendation from the U.S. Department of Transportation. Optional HPMS data is being collected, including skid resistance, sight distance, curve data and field evaluation of sample locations throughout the commonwealth.

A vehicle weight study is being conducted which monitors truck usage on highways by physically weighing vehicles in the field. Then the study estimates annual travel and ton miles of cargo handled.

Air quality considerations are an intregal part of the transportation planning process and the bureau has been actively pursuing the federally mandated goal of "clean air" through the "3C" process and by active involvement in two studies funded by the Environmental Protection Agency (EPA). The Section 175 Transportation/Air Quality Planning Program is a two year program that the bureau is working on with the Executive Office of Transportation and Construction, the Massachusetts Department of Environmental Quality Engineering (DEQE) and the regional planning agencies to prepare transportation components of the 1982 State Implementation Plan.

The second air quality study is the Northeast Corridor Regional Modelling Project (NECRMP) in which the bureau is working with DEQE to study the inter-urban transport of the pollutant ozone within the 13 Northeastern states. The bureau has been funded to collect traffic data and provide travel estimates by community and highway functional classification for the years 1980 — 1987.

Over the year, the bureau has coordinated work efforts with the regional planning agencies in the development of the activities necessary to obtain federal certification. Technical assistance was also provided to the regional planning agencies in the development of project level studies and corridor planning studies.

In addition, the bureau adopted for testing purposes the Performance Investment Analysis Process (PIAP), a technical approach for analyzing highway performance and for developing relationships between highway performance and investment strategies. This process allows for the assessment and prioritization of highway improvement alternatives. PIAP is being used by five of the regional planning agencies in the development of their transportation plans.

The bureau has also conducted continuous analysis on statewide motor fuel consumption and its effect on motor fuel tax revenues. The collection and analysis of the data is essential for effective highway planning and administration.

In the coming year, the bureau will continue to gear its policy oriented planning process to short range transportation plans and solutions which will foster economic growth and increased employment for the commonweath.

In addition, the bureau will respond immediately to future transportation needs with more energy efficient transportation projects, as well as, more cost effective solutions to long range, large scale transportation problems.

Highway Maintenance Division

Department maintenance refers to routine physical maintenance and betterment work. Physical maintenance consists of maintaining the highway and its existing facilities or restoring it to its orginally constructed condition. Restoration includes surface treatments of thin bituminous concrete overlays of less than 3/4" in depth.

No funds were appropriated for the regular maintenance resurfacing account in fiscal year 1980. However, funds were made available from the Accelerated Highway Program. Accordingly, 78 contracts were awarded during the year for the resurfacing of approximatley 206 miles of highway with class 1 bituminous concrete type I-1. The resurfacing varied in widths from 24 feet to over 60 feet and in depths from 3/4" to 3" at a cost of $25,900,000.00.

Through the use of $256,000.00 of federal funds, damaged guard rails on approximatley 8 miles of state highway were repaired and/or upgraded.

The department advertised two projects during FY 80 for energy conservation in highway maintenance work. One will utilize bottom ash residue as an aggregate in bituminous concrete pavements. The other will utilize extended sulphur as a partial substitute for liquid asphalt in bituminous concrete pavements. The several asphalt emulsion pavements put down over the past two years are still being studied as another alternate to asphalt cement pavements.

As of July 1, 1980, the Structures Maintenance Section had responsibility for the inspection of 4500 bridges, maintenance of 2800 bridges and record keeping of 7500± bridges. The inspection of bridges was completed in Districts 5 (Danvers), 6 (Taunton), 7 (Middleboro) and 8 (South Boston) and recommendations were submitted for review. The maintenance work load area is now approximately 2,800,000 square yards of bridge deck, plus superstructure and substructure elements.

During FY 80 the following work was accomplished:

2000	Bridge Inspections
4	Bridge Betterment Projects ($832,650.00)
10	Bridge Repairs Projects ($759,780.00)
2	RR Bridge Repair Projects ($129,120.00)
19	Bridges Painted ($467,870.00)

The above is in addition to routine (force account) maintenance.

Other responsibilities include communication and call box tower maintenance, buildings and overhead sign structures. During fiscal 1980 the Traffic Maintenance Unit processed both contract and force account projects in the area of signs, signals, safety devices and motorists' aid call boxes. A major problem was the interference from outside radio communication companies.

There were a total of 31 contracts issued for a total contract value of $1,315,000.00. Eighty percent of this work involved federal participation.

The 10,000 raised pavement markers that were installed at the beginning of 1980 were observed during winter plowing activities and only about 0.1% of the complete markers were lost. However, snow plowing activity over the markers was minimal due to the mild winter.

Pavement markings, safety devices, delineations and signs were purchased for traffic maintenance. The cost of these materials totaled $1,291,000.00 of which 18% of the

Several of the department's underwater bridge inspection team reviewing procedures before their dive.

total involved 90% federal assistance. These figures do not include the cost of signs fabricated at the state sign shop or traffic maintenance materials purchased directly by the district.

During fiscal 1980 the Traffic Maintenance Unit continued the training of supervisory personnel in the principles of traffic control through maintenance work zones by holding seminars in all the districts. A medical surveillance program was conducted for personnel associated with hazardous materials and self training electronic courses were purchased for the electricians.

The Communications Unit of the Boston firm of Electrocom Inc., representing Wescom Inc., microwave manufacturers, completed installation of the 2 GHZ microwave replacement for the existing channels to and from Mount Wachusett. This will add a capability of approximately 100 channels to the network and has enabled the department to accommodate other state agencies, such as, the Registry of Motor Vehicles and Department of Environmental Management, to tie into a microwave backbone system to the west. A contract has been awarded to Electrocom Inc. for a link between Plymouth and the State Street Bank in Boston.

These extensions will aid the commonwealth by speeding up and improving communications and providing alternatives to some of the present expensive means of inter-district connections.

The Maintenance Management System (MMS) Unit is receiving and processing activity reports from the maintenance gangs and producing 16 system operations reports. The MMS Unit is working on the production of the first computerized performance budget. The unit's assessment procedures are being implemented at this time. Completion of these last two elements will mark the end to the implementation phase of the total system.

Massachusetts DPW heavy 'V' type plow in action pushing back snow banks on Route 44, Middleborough.

The Safety Section has the responsibility to reduce the frequency of work related accidents through safety inspections, accident investigations, safety training and education. Chapter 512 Tort Liability Act was included in the safety meetings held in all districts and was explained in great detail.

During FY 80 the spring and fall truck inspection was undertaken according to Notice N78-67. With 1,065 in May and 959 in the fall, inspections were made which included recommendations to improve equipment.

The annual building inspections were completed and 354 department buildings were inspected statewide for safety hazards. Also, these inspections insured compliance with regulations of the Fire Program.

Motor vehicle accidents were reduced over the previous year by 21 incidences. In 1978 we had 198 accidents reported and 177 reported in 1979. Industrial accidents were also reduced over the previous year by 17 incidences. In 1978 we had 622 reportable accidents and 605 in 1979.

The Snow and Ice Unit was responsible for the planning and implementation of the plowing and treatment of 11,800 lane miles of state highway during the winter of 1979-80. To combat the mild winter, 102,400 tons of chemicals were applied to state roadways. This was a reduction from the average use of 175,000 tons per winter.

Maintenance training was accomplished during the spring of 1980. A five week welding course entailing 80 hours was conducted at the District 2 (Northampton) Office for 12 students representing Districts 1 (Lenox), 2 and 3 (Worcester). The course provided training in oxygen, acetylene and arc welding for the repair of department equipment and structures. Department personnel also attended automotive courses at the General Motors Training Center.

During the year the Permit Section issued the following permits:

	No. of Permits
Heavy Equip., House Trailers & Buildings	20,390
Utilites	219
Driveways	76
Reducible load permits (Gravel, Stone, Bituminous Concrete and Oil)	5,992
Total	**26,677**

During fiscal 80, 17,642 had also been issued via transceiver.

The Equipment Unit purchased 442 pieces of equipment ranging from self loading sweepers to two-way mobile radios at a cost of $3,293,388.28.

Bureau of Traffic Operations

The Bureau of Traffic Operations, due to the increased complexity of transportation systems from the inner urban areas to the outer suburban areas, has concentrated on transportation management engineering. The objective has been to balance the transportation system of highways and railroads with aircraft, boats and bikeways, for efficient systems management and continuous improvement of highway pedestrian safety. The bureau works closely with other divisions within the department, as well as, with state, municipal and federal agencies to provide improved traffic operations and services to meet the needs of the commonwealth. In addition, the bureau has become involved in rail transportation improvements.

Energy conservation continues to have high priority within the bureau. Measures to improve traffic flow not only increase the motorist's convenience but also aid in reducing fuel consumption. These include free fringe parking areas with bus service into the core city, vanpools with reduced toll fees and free parking areas and industry wide flex-time working hours.

On January 1, 1980 a Right Turn on Red (RTOR) legislative bill was enacted which allows a RTOR everywhere except where signs prohibiting it are posted. The number of signalized intersections allowing RTOR has increased from the original 10% at the time the law was enacted to 77% for state controlled intersections and 52% for municipal controlled ones.

Governor's Highway Safety Bureau

The Railroad and Highway Safety Unit administers a program in conjunction with the Governor's Highway Safety Bureau which municipalities and the department receive funds for various activites and safety related equipment.

The department received the following: 10 work zone protection kits ("Detour Kits") for district maintenance sections; 8 retro-reflectometers to measure light sensitivity of highway signs; 5 inspection vans for the Underwater Bridge Inspection Program; funding to rehabilitate and calibrate the department's skid testing equipment; and traffic counting equipment and accessories for the Bureau of Transportation, Planning and Development's traffic counting program.

Along state highways "Conserve Fuel" attachments atop 55 miles per hour speed limit signs serve as conservation reminders to motorists.

Railroad-Highway Grade Crossing Improvement Program

Forty-six railroad highway grade crossing improvement projects were authorized for construction under this on-going safety program during FY 80. There were 24 projects federally funded for RR grade crossing improvements, costing $2,375,000, 6 federal aid secondary rural projects funded at $535,000 and 16 federal aid urban systems (Worcester urban area) funds at $1,804,000. This work included track and surface improvements and improved signal circuitry and crossing gate arms. There are two new experimental high density polyethylene modules for the track surface. The other crossings will have railchair, precast concrete, or rubber track surfaces which have been used successfully since the beginning of the program.

The diagnostic inspection team has reviewed 58 other crossing locations and made specific recommendations for reconstruction when additional funding becomes available.

Accident and Traffic Analysis

During the 1980 fiscal year, this unit developed an "Action Plan for Truck Weight Enforcement" and are presently implementing this plan. A traffic control plan was developed and implemented for the Bourne Bridge, which is being constructed by the U.S. Army Corp of Engineers.

This unit expedited and completed a contract with Greenman-Pedersen Associates, for a traffic study around the University of Massachusetts Medical Center in Worcester. The unit also played a key role in developing the I-93 Joint Transportation Study.

Storage lanes for left turn movements and pavement markings for safe traffic movements shown on Framingham section of Route 9.

Signal and Lighting Unit

In FY 80 the department in cooperation with the city of Boston, completed negotiations with Sperry Systems Management of Great Neck, N.Y. to furnish systems management services for a citywide computer control traffic signal system. This system will control approximately 360 signalized intersections with expansion capability to 390.

The Signal Unit advertised and awared $600,000 signal improvements under the State Signal Up-dating Program for conformance to the "Manual of Uniform Traffic Control Devices." The projects covered 42 locations; 7 municipal and 35 state locations.

The highway Lighting Modification Program, which will eventually convert all state highway light sources from mercury vapor to high pressure sodium, was continued. This effort consisted of replacing at various locations mercury vapor highway lighting with high pressure sodium; 170 in district 3 (Worcester) and 250 in district 4 (Arlington). The estimated savings in electrical energy at the converted locations is 47%.

Sign and Pavement Marking Unit

The Sign and Pavement Marking Unit reviewed, corrected and approved the contract documents submitted by consultant design engineers for Federal Highway Administration (FHWA) projects, as follows: 41 interstate and state highways, 173 urban design, 76 for 850 Items (any traffic control devices used to guide motorist through work zones), 6 in-house design, and 11 shop drawings.

The following studies and/or projects were implemented: District 2 Secondary Sign Project, District 1 & 5 Route Marker Projects, 742 sign order forms for the 8 districts and the Sign Unit, reviewed and recommended use of STAMARK temporary pavement marking and reviewed and recommended (in a pilot project) the use of ARMCO RIB BAK sign support.

Speed Regulations Program

The Speed Regulation Section operates a continuous program for monitoring vehicular speeds on our state highways. The department submits quarterly reports to the FHWA for annual certification of speed limit enforcement. The federal regulations require the FHWA reports be based on a representative sample of all vehicles as opposed to "free flow vehicles" showing the average speed, medium speed, and 85th percentile speed of all vehicles. The continuing study also indicated the percent motorists exceeding 55, 60 and 65 mph.

Regulations

In the year since the passage of the RTOR Law in July 1979, the Regulations Section has processed and issued permits for the required regulations of 115 cities and towns.

The funds ($3,000,000) allocated for reimbursement to cities and towns by Chapter 616, Legislative Acts of 1967 for installing school zones have beeen seriously depleted. Because of this funding depletion, new permits issued will be with the explicit understanding that the municipality would bear the total cost.

Data Processing Section

Computer operator Lenny Goler (left) reviews a computer output with Data Processing Section's programming supervisor Robert Chaput.

The Data Processing Section continues to provide service to all sections of the department including the eight district offices. The major portion of the workload is for transportation planning with the remainder equally divided between engineering and administrative service applications.

This section began the 79-80 fiscal year expanding in two major areas. The first area of expansion is in the on-going batch processing at 100 Nashua Street, with over 7000 jobs per month being processed with two shifts in operation year round. The second area of growth is in tele-processing which includes a network of terminals linked to the computer center. Here, the measurement of growth is in computer terminology such as, connect-time and response-time.

The advantageous purchase of the department's IBM 370/148 computer saves more than $150,000 per year; the probable acquisition of more "memory" will double its power. The use of data entry equipment instead of keypunch machines vastly improves bulk data input. However, the most sweeping changes are those engendered by the scheduled arrival of a score of screen display type terminals. These are replacing existing terminals in the districts and bringing interactive capabilities to new locations elsewhere in the department.

Eventually all DPW systems will require evaluations as a result of these hardware changes and the virtual machine concept. Already development has taken place in several application areas, system management, project management and software tools development. Development has also occurred in the Traffic Counting System, where revisions to a decade old system involves new technology and extensive re-programming.

The task of managing the increasing complexities of payroll and retroactive adjustments according to the diverse standards imposed by each bargaining unit places heavy demands on the Data Processing and the Payroll Sections. The personnel system has developed into an important role to ensure the department's compliance with equal opportunity objectives.

Other areas of advancement in the data processing operations include the successful completion of the project to provide computerized assistance in managing snow equipment contracts which has attracted nationwide attention. In facing the energy crisis, the department and other agencies made use of this section's expertise in carpooling, vehicle management and bulk fuel purchases.

In-house training in new systems approaches and interactive control language has been given to section personnel. Similar classes geared to department users are planned.

Research and Materials Section

The Research and Materials Section is responsible for a variety of physical research projects. Responsibilities also include complex testing of materials used in highway and bridge construction and maintenance.

One of the section's major components is the laboratory located in Wellesley. For testing and detailed analysis purposes, this is divided into four units, as noted:

1. Bituminous Testing: quality control of asphalt and bituminous concrete mixes and testing and evaluation of new products, especially recycled materials such as incinerator residue and fly ash.
2. Chemical: paint, chlorides, pesticides, adhesives and many other products are analyzed. Environmental testing is conducted on materials, such as water and soils, especially as it applies to highway construction and maintenance.
3. Concrete: portland cement and concrete are tested, as well as, reinforcing steel, brick, pipe and fencing materials.
4. Soils: earth materials, gravel, sand, peat, loam, etc. are analyzed, as well as, studies on stabilization of soils using lime-fly ash and portland cement.

The Field Materials Control Unit has the responsibility for the monitoring of the plants which manufacture products used in highway building. There are more than two hundred bituminous concrete and cement concrete plants in the state which, at one time or another, service department projects. Their manufacturing equipment, techniques and controls must be approved by this unit.

All other manufacturing plants, such as steel, prestressed concrete, pipe, catch basin and manhole block companies must be inspected and their products approved on a regular basis.

In addition to its plant monitoring, the Field Materials Control Unit is responsible for all progress record sampling on construction projects (245 of them in 1980). This unit is also charged with detailed review of materials documentation on these projects.

The Soils and Foundation Unit continues to provide expert consulting services on geotechnical matters, manages the department boring crew and supervises all boring contracts. This unit also performs all engineering property testing of soils.

Among the various active research studies are "Surface Characteristics of Pavements" involving skid testing and a study in cooperation with the U.S. Geological Survey related to pollution control. The University of Lowell is assisting the department with its study of frost susceptible soils. Besides its research activities, the Skid Testing Unit, in cooperation with the Bureau of Transportation, Planning & Development, is inventorying all state highways with reference to skid resistance.

Demonstration of Research & Materials' "Skid Tester" vehicle.

The District Story

District 7

District 7 is sometimes referred to as the "Cape district" which may be an appropriate designation, for Barnstable County (Cape Cod) lies within this district. However, the district also includes Plymouth County, the town of Cohasset (Norfolk County), the offshore islands of Dukes County (Martha's Vineyard and Elizabeth Islands) and Nantucket County. The district covers 50 communities, 33 which border along the coastline, encompassing a distance of 110 miles.

The heaviest traffic on this district's highways occurs during the summer months because of its tourist oriented economy. Construction, therefore, is limited to spring and autumn as not to inconvenience motorists nor disrupt the economy.

In FY 80 the district's Construction Division administered over $30 million in contracts. One such contract presently under construction is the $12,000,000 Route 25 extension from Wareham to Plymouth. When the last link of this project presently under design clears all legal hurdles, access to the Cape Cod Canal via the expressway will be realized.

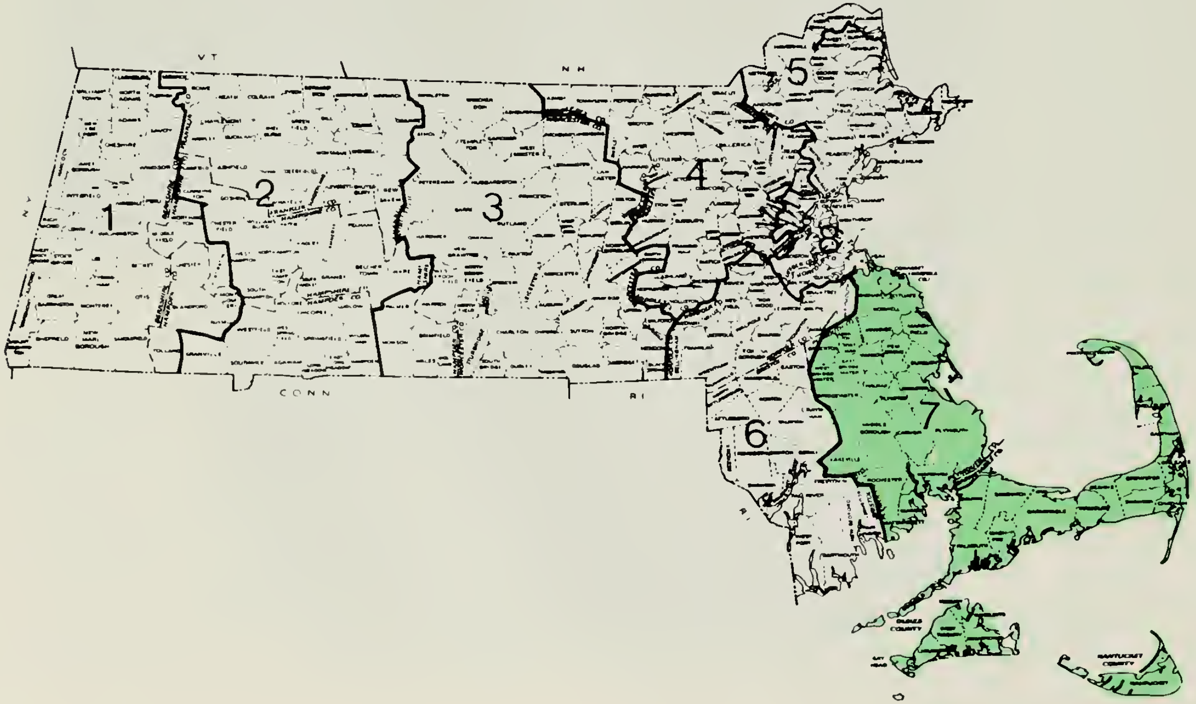
The district's Projects Section is now involved in upgrading the 21.6 mile section of Route 25 from Lakeville to the end in Wareham. This will compliment the completion of the relocated Route 25 from Wareham to the Bourne Bridge and the extension of I-495 between Route 25 and 24 presently under construction in District 6.

Another on-going project is the 12.2 mile upgrading of route 28 from the Bourne Bridge to Falmouth. The first section of this project, 4.5 miles of MacArthur Boulevard, was completed in July 1980. The next 4 miles from Connery Circle will begin in the spring of 1981. The third and final 3.7 mile section is under design and will be ready for advertising in the summer of 1981.

Projects submitted for advertising by the district Projects Section in FY 80 totalled approximately $4,500,000. Projects personnel also have three State Aid Projects totalling $1 million under design and various Urban System Projects under design for $1.5 million.

Another responsibility of this section is the expediting of five projects under design by consultants. These projects encompass 25 miles of roadway at a cost of approximately $5.5 million.

The Maintenance Section is responsible for the upkeep of 500 ± lineal or 1,750 ± lane miles of state highway. In 1980 the Maintenance Section submitted contracts for resurfacing, surface treatment and other projects which have been advertised and awarded. These contracts totalled $3,752,000 (resurfacing), $453,000 (surface treatment) and $20,200 (other projects). The 1981 Maintenance Program, currently under design, include projects totalling



$10,000,000.

District Bridge Maintenance personnel inspect and maintain 287 bridges of which 115 are over highways, 119 over waterways (two of which are drawbridges), 49 over railroads and 4 combinations. This section is also responsible for the repair of 60 buildings and 17 salt sheds.

The scuba diving team made underwater inspections of 53 bridge structures. The team has made emergency repairs to the Wareham Narrows Bridge which required the rebuilding of its steel piles. Also, repairs to the Harris Creek Bridge's wooden piles were completed. In both cases, this prevented the restrictive posting of these bridges which would have been detrimental to the towns.

The district Traffic Maintenance Section has the responsibility for the painting of traffic pavement markings on 500 lineal miles of state highway and 220 miles of town roads. It also maintains 115 signals, 109 flashers, 21,000 signs and 30,000 delineators.

The district's Roadside Maintenance Section maintains 3,500 acres of roadside. There is a continuous program of tree removal, trimming, replanting and spraying of tree and bushes.

This district spread 11,000 tons of sand, 17,000 tons of salt and 1,000 tons of pre-mix during the 1979/80 winter season. During a normal storm there are approximately 200 pieces of equipment and 250 persons (both hired and state) for snow and ice removing operations.

The Materials Section oversees the quality control of highway materials throughout the district. Included in this quality control is the inspection of 10 bituminous concrete plants and 10 cement concrete plants.

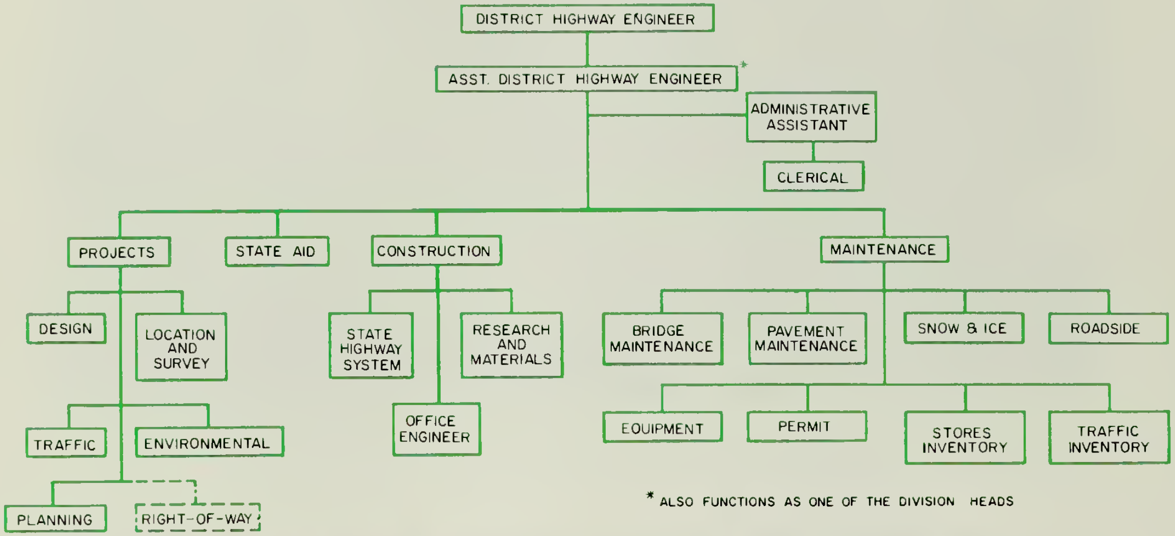
This section has successfully implement-

(continued on next page)

Veto Cassese, District Highway Engineer seated, pictured with key members of his District 7 staff. Left to Right: Axel Nummi, State Aid Engineer; Andrew McGowan, Administrative Assistant; Robert Smith, Maintenance Engineer; Lionel LaBelle, Project Engineer; and Paul Monahan, Construction Engineer.

District 7 office personnel.

MDPW DISTRICT



* ALSO FUNCTIONS AS ONE OF THE DIVISION HEADS

District 7 office area.

1176 62

District 7

(continued from page 31)

ed many research projects highlighted by the first cement stabilized soil base course used on a primary highway system. Another research project implemented is the first use of bituminous concrete open graded surface treatment course. Research work also led to the acceptance of using vibrating rollers on bituminous concrete top course.

District 7's State Aid Section provides engineering services, guidance and department liaison to 50 communities, including one city, in administering the department's State Aid Program. The area this is administered in encompasses four counties, which include Cape Cod, two major islands and two smaller islands totalling 1,765 square miles with 3,700 miles of local roads.

The design of State Aid Projects may vary due to geographical location. Different types of soil stabilization need to be considered for the Cape and islands where soils tend to be sandy and unstable as opposed to the more stable gravel soils of Plymouth County.

The district Planning Office is jointly working with the Boston Office for commuter park and ride area developments. The planning engineer has been assigned the task of designing and estimating these facilities throughout the district.

The successful operations of District 7 reflects the cooperative effort between MDPW personnel and the community. Typical of all district offices, District 7 depends on its employees to skillfully apply education, training and experience to carry out their responsibilities. Again, this dependency adds to the department's successful management.

MASSACHUSETTS
TMENT OF PUBLIC WO
1980
Make it
in
Massachusetts

PRINCIPAL MASSACHUSETTS DEPARTMENT OF PUBLIC WORK OFFICIALS

Commissioner
DEAN P. AMIDON

Associate Commissioners
THOMAS G. BARLOW
PETER E. DONADIO
FRANK D. RODICK
SANDINO J. TERSIGNI

Chief Engineer
JUSTIN L. RADLO

Director, Bureau of Transportation & Development
EDWARD H. COLLAGAN, JR

Assistant Commissioners
JOSEPH DONOVAN
DANIEL O'LEARY
Director, Right of Way Bureau
JOSEPH FANALE

Director of Administrative Services
GEORGE PHANEUF

Director of Capital Expenditures Program Office
GEORGE JOSEPH

Director, Public Information Office
WILLIAM C. PIZZANO

Chief Counsel
THOMAS K. STEELE, JR.

Hearing Examiner
PETER MILANO

Secretary to the Commission
LOLITA C. HARRIS

Deputy Chief Engineers
ROBERT J. MCDONAGH
Bureau of Project Development

FRANK SHOLOCK
Highway Engineering Division

KAY K. KREKORIAN
Bureau of Traffic Operations

NORMAN DIEGOLI
Highway Maintenance Division

WILLIAM BILLINGS
Highway Construction Division

Chief Right of Way Agent
EDWARD SMITH
District Highway Engineer

ELLSWORTH SAMMET — District 1
FRANCIS J. HOEY — District 2
HENRY HOLMES — District 3
CHARLES MISTRETTA — District 4
SHERMAN EIDELMAN — District 5
JOSEPH CRONIN — District 6
VETO CASSESE — District 7
EDWARD COX — District 8
Superintendent of Shop & Equipment
JOHN J. SULLIVAN — Wellesley